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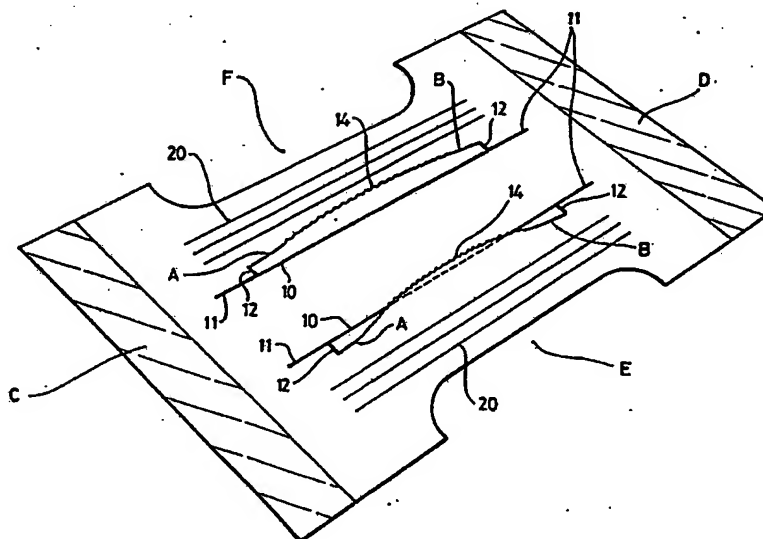
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(54) Title: DIAPER



(57) Abstract

The present invention relates to a sanitary article, notably a disposable diaper, formed from a composite fabric having a fluid impervious outer layer (1), an intermediate absorbent layer (2, 4) and an inner layer (5, 7), characterised in that at least two parallel slits (10) are formed in a sheet in the inner layer of the article, preferably axially in the crotch area of the diaper in the exposed next-to-the-skin sheet (7) of the diaper or in a sheet (5) underlying that sheet; and in that at least the outward lip (13) of each slit is provided with means whereby that lip is caused to adopt an upstanding configuration to provide a cuff which is upstanding with respect to the plane of the sheet in which it is formed over at least part of the axial length and/or transverse width of the article. Preferably such means is provided by one or more of the axial elastification threads (11) in the diaper fabric.

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TITLE: DIAPER

The present invention relates to diapers, notably to a disposable diaper having leg cuffs to retain bodily fluids
5 and/or solids excreted into the diaper by a wearer.

BACKGROUND TO THE INVENTION:

Disposable diapers typically comprises a fluid permeable
10 next-to-the-skin layer and a fluid impervious outer layer with an intermediate fluid absorbent layer. The next-to-the-skin, or inner, layer is typically made from a hydrophillic woven or non-woven sheet material, for example a polypropylene or other resin sheet or a cellulosic tissue
15 or other permeable sheet and functions to allow the bodily fluids to pass through the sheet to be absorbed by the intermediate absorbent layer. Various modification of such an inner layer have been proposed. These include treatment of part of the layer to form hydrophobic lateral portions
20 and to render the layer resistant to back flow of fluid once this has passed through the latter so as to reduce re-wetting of the skin of a wearer.

The outer layer can be a water impervious sheet, for example
25 of a polyethylene or other polymer and serves to retain fluid within the diaper. Again modifications to such a layer have been proposed, for example to perforate the sheet or otherwise permit the passage of vapour but not fluid so that at least part of the fluid carried by the absorbent
30 layer can be lost by evaporation through the outer layer without the outer face of the outer layer becoming damp to the touch.

The intermediate layer is typically formed from a pad of dry
35 formed cellulosic or other fibres, which may be solid or

hollow, and which serves to absorb fluid passing through the inner layer. Such a pad can be formed by fluffing up a layer of cellulosic fibres mechanically, by heat, pressure or other bonding of short lengths of fibres or by forming a
5 tangled mass of a long fibre, which may carry one or more heat, pressure or other forms of adhesive so that the fibre pad forms a coherent body. The pad can be formed as a single or multi-layer construction and can be contained within an envelope of a tissue paper or other sheet material
10 to retain the fibres as a pad of the desired shape and such an envelope can be heat bonded or otherwise adhered to the surface layers of the fibres in the pad.

Typically, such a diaper is formed from its component parts
15 as a length of a composite fabric from which the desired shape of diaper is cut by stamping, water jet or air blade cutters. If desired, the various layers making up the composite diaper fabric can be bonded together, for example using a pressure or thermal adhesive or a UV set-able
20 adhesive applied as a series of stripes or as an overall spray of the adhesive to the relevant faces of the layers during the bringing together of the layer materials. The cutting away of the parts of the diaper to give the desired anatomically shaped, ie. waisted shape, diaper can be done
25 as each layer is introduced during the construction of the diaper and such cutting can also cause thermal bonding of the cut edges, as when a cutter/sealer bar is used to cut layers made from or adhered together by a thermoplastic resin.

30

Typically, such diapers have a T or H plan shape with the upright of the T or the cross bar of the H passing between the legs of a wearer to lie adjacent the crotch area of the body of the wearer. This area of the diaper is typically
35 formed with a waisted plan shape to assist the diaper to

conform to the anatomical shape of the body of the wearer. The cross piece of the T or the uprights of the H are then passed around the waist of the wearer and the overlapping free ends thereof secured together, preferably by a self
5 adhesive pad or the like attached to the free ends, to form a waistband around the body of the wearer and thus secure the diaper in position upon the body of the wearer. To assist a close fit of the diaper and to accommodate variations in the size of the wearer's body, it has been
10 proposed to incorporate elastics into the waistband of the diaper and along at least along the crotch/anal region of the diaper. Such elastics can be introduced by inserting tensioned elastic threads or tapes between two or more of the layers of the diaper fabric at the desired
15 position during manufacture of the diaper or by accordion folding the area to be elastically and inserting or adhering an elastic thread in a relaxed state to achieve a shirred effect. Alternatively, a thermally elastically thread, tape or strip can be applied in its elongated state to one face
20 of the diaper or inserted between layers during manufacture of the composite fabric. Upon heating, such a material will revert to its shorter elastic state and achieve a similar shirred effect.

25 In order to enhance the fit of such a diaper upon the body of a wearer, it has been proposed to incorporate one or more upstanding cuffs along each side of the crotch area of the diaper. Such cuffs act to restrain the escape of fluid and faeces from the diaper either by acting as a dam or by
30 acting as a filter so that undesirable leakage of bodily fluids and/or solids is reduced as the diaper is flexed by the body movements of a wearer. Typically, such cuffs are provided as extra strips of material at or adjacent the longitudinal edges of the crotch area of the diaper and are
35 caused to be upstanding by carrying longitudinal tensioned

elastication along their free longitudinal edges. Such elastication can be introduced by inserting a tensioned elastic thread into a pocket formed along the edge of the strip, by adhering such a tensioned thread at or adjacent
5 the edge or by applying a heat elasticisable thread tape or strip along the edge.

The strip of additional material forming the cuffs can be of any suitable material, for example a hydrophobic form of the
10 inner layer material or a fluid impervious material as used in the outer layer of the diaper.

Such a diaper is made by bringing together continuous lengths of the layer materials to form the composite fabric
15 from which the individual diapers are cut. The leg cuffs are therefore typically formed by applying two parallel continuous lengths of material of the required width to the inner layer material on its next-to-the-skin face and securing them in position by adhesive, thermal and/or
20 pressure, UV or HF bonding along at least their laterally outward edges, leaving the laterally inward edges free. Typically, the whole transverse width of these additional strips will be secured to the inner layer material at the waistband end areas of the diaper.

25 The number and location of the elasticated areas along the edges of the leg cuff, along the edges of the crotch areas and waistbands of the diaper can vary; for example it will be usual to use three or more parallel rows of elastic
30 threads along or inset from each of the edges of the diaper in the crotch area. The leg cuffs can be secured laterally inside or outside some or all of these rows of thread and the thread or threads along the laterally inward edge of the leg cuff strips can be located at the edge of the strip or
35 inset some distance therefrom to give a ruffled type of edge

to the cuff.

When the individual diapers are cut from the length of composite fabric, the tension in the fabric is released and
5 the diaper adopts a concertina configuration due to the elastic threads, tapes or strips within its structure. This causes the leg cuffs to upstand generally normal to the plane of the remainder of the diaper.

10 For convenience, the term disposable diaper will be used herein to denote in general the above basic type of diaper and its various modifications. The invention relates to disposable diapers having leg cuffs.

15 If care is not exercised during manufacture of such diapers, adhesive may be applied along part or all of the cuff strip and prevent this upstand. Alternatively, where a cuff is formed along the whole front to back length of the diaper, this has a tendency to flop over when the diaper is being
20 applied to the wearer and this causes a source of leakage at the points where the cuff flops first inwardly then outwardly.

We have devised a novel form of a disposable diaper which
25 has a novel form of leg cuff which reduces the above problems and does not require the use of extra material to form the cuffs. This reduces the material costs and the number of operations required to form the cuffs.

30 SUMMARY OF THE INVENTION:

Accordingly, the present invention relates to a disposable diaper, characterised in that at least two parallel slits
35 diaper composite fabric in the crotch area of the diaper and

in that at least the outward lip of each slit is provided with elastics or other means whereby that lip is caused to adopt an upstanding configuration with respect to the sheet in which it is formed so as to provide an upstanding
5 cuff extending in the next-to-the-skin face of the diaper over at least part of the axial length and/or transverse width of the diaper.

The invention also provides a method for forming a leg cuff
10 in a disposable diaper, which method comprises forming two parallel slits in a sheet in the next-to-the-skin surface layer of the diaper and providing one or more elastics or other means at or adjacent at least the outward lip of the slits whereby that lip is caused to adopt an upstanding
15 configuration when the diaper is in the relaxed state.

Preferably, the two parallel slits are formed by cutting the exposed sheet of the next-to-the-skin layer of the diaper composite fabric. However, it is within the scope of the
20 present invention to form the slits in a sheet of material underlying the exposed next-to-the-skin sheet where the exposed sheet can flex sufficiently to allow the lip of the slit formed in the underlying sheet to raise the overlying sheet to form a cuff which can conform to the body shape of
25 a wearer of the diaper. The term next-to-the-skin surface layer is therefore used herein and in the claims to denote a layer of the composite diaper fabric which is located between the skin of the wearer and the absorbent layer of the diaper construction. For convenience, the invention
30 will be described hereinafter in terms of a diaper having the slits formed in the exposed the next-to-the-skin sheet of the composite fabric.

The slits can be formed transversely adjacent the axial ends
35 of the diaper as well as or in addition to being formed

axially over at least the crotch area of the diaper. However, the invention will be described hereinafter in terms of slits which are formed axially.

- 5 The slits can extend for part or all of the axial length of the diaper. However, it is preferred that the slits extend axially over the area of the diaper into which the bulk of the bodily fluids and solids are to be excreted. Thus, for
10 diapers intended for use upon a male baby or person, the slits will extend axially over the anal area and an area extending axially forward thereof and into that length of the diaper which is to be folded upward over the lower abdomen of the wearer. In the case of a diaper to be worn
15 by a female, the slits need not extend axially forward as far from the anal area and will usually extend rearwardly of the anal area. In this way gender specific diapers can readily be fabricated merely by varying the location and/or length of the slits. It is also preferred that the axial
20 extremities of the openings in the sheet provided by the slits are closed, for example by the transverse seal usually used to form the waistband area of the diaper, so that excreta or other material trapped by the upstanding cuff can not escape axially.
- 25 The slits are preferably located transversely inwardly of the edge elasticated areas extending axially in the crotch area of the diaper construction so that the cuffs form an internal seal, with the edge elastication forming a further outward seal against the body of the wearer. However, this
30 is not essential and the slits can be formed within the width of the elasticated area. In this case, one or more of the elastic threads used to elasticate the crotch area of the diaper can be adhered solely to the next-to-the-skin layer of material and not to an intermediate layer or sheet
35 in the composite fabric. This thread can then be used to

provide the means to raise the lip of the slit to form the cuff without the need for further elastication. For convenience, the invention will be described in terms of a conventional diaper construction where the cuff is located
5 laterally inside of the edge elastication areas in the crotch region of the diaper and preferably within the plan area of the absorbent layer of the diaper.

The slits can be formed by any suitable technique, for
10 example by cutting a curved, dog leg or other shaped slot or aperture in the next-to-the-skin layer of material as it is fed to the diaper fabric construction process, and removing the severed part of the sheet. However, it is preferred to form the slit by forming a straight line cut in the material
15 with no significant width to the cut, for example with a knife blade, a water jet or air jet cutter. In the case of a thermoplastic sheet material, the slit can be cut and the tensioned elastic thread or other lip raising means secured in position by the use of a heated cutter/sealer. For
20 convenience, the invention will be described hereinafter in terms of a slit which is cut with a rotary die cutter as conventionally used in cutting diaper fabric.

If desired two or more pairs of slits can be cut so that a
25 plurality of pairs of parallel cuffs are formed lying symmetrically or asymmetrically to each side of the axial centre line of the diaper. Furthermore, the axial slits can be combined with transverse slits to provide both axial and transverse cuffs. However, it will usually be sufficient to
30 form one axial slit to each side of the centre line of the diaper.

The transversely outward lip of the slits are provided with elastication or other means whereby the lip is caused to
35 upstand. Thus, the fabric of the sheet into which the slit

is cut can be provided with an underlying secondary sheet or other means which has a set or bow imparted to it which causes the transversely outward lip of the slit to curl upward. Alternatively, the slit can be cut in a sheet of material which is stretched transversely to the axis of the diaper so that the cutting of the slit releases the inward restraint on the fabric and allows the outward lip of the slit to curl upwards. However, it is preferred to cause the lip of the slit to upstand by foreshortening the lip axially by means of one or more of the axial elastication threads conventionally used in fabricating a diaper. This elastication is typically provided by one or more elastic threads applied under tension using conventional techniques, for example by applying a thread coated with a hot melt or pressure sensitive adhesive axially along the desired area of the lip and applying heat and/or pressure thereto, for example as the next-to-the-skin material is bonded to the underlying portions of the diaper fabric. Alternatively, the lip of the slit can be folded transversely to form an axial sleeve around the thread and the sleeve secured upon the thread by adhesive or the like.

In a particularly preferred embodiment, the next-to-the-skin sheet of material, notably a spun bonded or thermally bonded non-woven polyester or polypropylene fibre or a cellulosic fibre fabric sheet, is provided with at least part of the elastication of the crotch area of the diaper attached thereto as a series of parallel axial threads over an area which extends across substantially the width of the diaper. The threads are secured to the material over their axial length extending into the axial area where the slits are to be formed. Preferably, the threads are not secured to the material for between 25% and 85% of the axial length of the area within which the slits are to be formed. One or more of the axial elasticated threads are located in register

with where a slit is to be formed in the material. An axial slit, optionally with a transverse cross-cut at each end thereof, is cut in the material. The cross-cuts also sever the elasticated thread at each end of the axial slit and
5 form a flap in the material. The thread is secured to the material at the axially terminal portions thereof where each cross-cut is formed so that tension is retained in the thread. The free edge of the flap is then folded over the elasticated thread to form a sleeve within which the thread
10 is journalled. The sleeve and at least part of the thread therein are secured in position, for example by adhesive. The thread within the sleeve is retained in its at least partially tensioned state by virtue of being secured to the sheet of material at the axially ends of the sleeve within
15 the length of the axial slit. However, preferably from 40% to 60% of the axial length of the thread within the sleeve is not adhered to the sleeve material and is free to move axially within the sleeve. Thus, when axial tension is released from the sleeve, for example when the individual
20 diaper is cut from the composite fabric, the elasticated thread causes the sleeve to contract axially with respect to the remained of the diaper so as to form the upstanding cuff.

25 The axial slits and the resultant cuffs can be formed in a sole layer of material located between the absorbent layer and the skin of the user. However, it is preferred to form the slits in an extra sheet of material which is applied over what would have been the exposed next-to-the-skin layer
30 of the diaper so that an intermediate sheet of material which has retained its integrity is located between the skin and the absorbent layer of the diaper. This is particularly preferred where the absorbent layer is formed from a material which would be liable to escape through the slits,
35 for example where the absorbent layer is formed from a loose

mass of fibres which are not bonded to one another or retained within an envelope or where the absorbent layer contains loose granules of a super absorbent additive to enhance the fluid absorbent properties of the diaper. Thus, 5 the diaper of the invention can be readily formed by applying a suitably apertured and elasticated sheet as a top sheet upon or as an intermediate sheet within a conventional composite diaper fabric, thus reducing the amount of modification required to the diaper production process and 10 machinery. In this case the adhesive or other bonding means securing the overlying or intermediate sheet in the overall composite fabric does not extend over the area where the axial slits are to be formed.

15 The sheet underlying or overlying the slitted sheet can extend for the full width and length of the diaper. However, it may be preferred that this overlying or underlying sheet be narrower than the slitted sheet on the grounds of economy, provided that the underlying or 20 overlying sheet extend laterally and axially beyond the position of the axial slits.

The underlying structure of the remainder of the diaper, that is the absorbent layer and the fluid impervious outer 25 layer can be of conventional design and construction. However, it is particularly preferred that the absorbent layer carry and/or contain one or more additives which enhance its fluid absorption properties. Thus, it is preferred that the second sheet of non-woven material 30 underlying the exposed next-to-the-skin sheet carry adhered to the under, or absorbent-layer-adjacent, face thereof particles of a super absorbent material. Typical of such materials are cross-linked polyacrylate homo- or co-polymers, notably co-polymers between acrylic acid or 35 acrylonitrile with vinylic monomers or cellulosic materials.

Such materials preferably have a particle size of from 100 to 1000 micrometres and absorb up to 200 times their own weight of urine. If desired, such super absorbent particles, eg. as granules or powders, can also be
5 incorporated into the absorbent layer itself, for example by applying a layer of such particles to an initial layer of the fibres used to form the absorbent layer and then applying the remainder of the fibres to complete the absorbent layer. A layer of super absorbent particles can
10 also be applied to the body side face of the absorbent layer and bonded in place by thermal bonding or by the application of an adhesive. If desired, the particles and/or adherent layers can contain localised higher concentrations of the super absorber in the regions where maximum absorbency is
15 required.

As indicated above, it is preferred that the various layers of the diaper composite fabric be bonded together to form a unitary construction, for example by the application of heat
20 and/or pressure or the use of adhesive coatings, notably UV of high frequency radiation cured adhesives. The bonding together of the various layers assists retention of the particles of super absorber in the desired locations and the formation of the upstanding cuffs when the axial tension is
25 released from the diaper.

The invention has been described above in terms of a disposable diaper. However, the invention can be applied to other articles which are to be applied to or worn by a
30 person to receive and absorb urine, blood or other bodily fluids, for example sanitary towels or pads and wound or other dressings. For convenience, the term sanitary articles will be used herein and in the claims to denote in general all disposable articles which are to be worn upon or
35 applied to the person to receive and absorb bodily fluids.

From another aspect, the present invention also provides a sanitary article formed from a composite fabric having a fluid impervious outer layer, an intermediate absorbent layer and an inner next-to-the-skin layer, characterised in that at least two parallel slits are formed in a sheet in the next-to-the-skin layer of the fabric, and in that at least the outward lip of each slit is provided with means whereby that lip is caused to adopt an upstanding configuration to provide a cuff which is upstanding with respect to the plane of the sheet in which it is formed over at least part of the axial length and/or transverse width of the article.

DESCRIPTION OF THE DRAWINGS:

To aid understanding of the invention, a preferred form thereof will now be described by way of illustration with respect to the accompanying drawings, in which Figure 1 is a plan view from the next-to-the-skin side of the diaper; and Figure 2 is a transverse cross-section through the diaper of Figure 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT:

The diaper comprises an outer fluid impervious sheet layer 1, for example an imperforate or microporous sheet of polyethylene or other water impervious plastic. To this is bonded a pad 2 of cellulosic fibres, for example the loose bed of wood fibres obtained by passing a sheet of pulp board card through a hammer mill or the like. The pad can be contained within a tissue paper or similar envelope (not shown) and is preferably bonded to the outer layer 1 by axially extending beads 3 of a hot melt adhesive or a coating of a pressure sensitive adhesive applied over the interface area between sheet 1 and pad 2. Within pad 2 is

formed a layer of polyacrylate super absorber granules 4 to enhance the fluid absorption properties of the pad 2.

Over pad 2 is bonded a non-woven sheet 5, preferably of a polypropylene polymer or a cellulosic bonded fibre sheet, which is pervious to bodily fluids. This sheet can be a conventional hydrophobic material or can have the axially central area treated with a surfactant to aid passage of urine and other fluids through the sheet. This sheet can extend laterally for the full width of the diaper as shown dotted, but preferably extends only for part of the width so that it extends beyond the axial slits to be formed in the next-to-the-skin sheet of the composite fabric.

Bonded to the underside of the sheet 5 are a series of axial parallel elastic threads 6 which are fed to the interface between pad 2 and sheet 5 under tension during construction of the diaper. Preferably the threads 6 are coated with a contact or hot melt adhesive so that passage of the diaper during its construction through the nip of a pressure and/or heated roller, preferably having a diamond or other shaped pattern of upstanding ribs on its surface, will cause the component layers of the diaper to bond to one another with the threads retained in position under tension. If desired, further particles of the super absorber can be carried on the lower face of sheet 5.

In the embodiment shown in Figure 2, a second sheet 7 of water pervious material carrying a series of tensioned axial elastic threads 8 is applied over sheet 5 and bonded thereto. This sheet extends the full width of the diaper to provide the next-to-the-skin sheet of the diaper composite fabric construction. In order to permit the material forming the axial cuffs to upstand, the adhesive or other bonding agent is omitted over the axial length of the

proposed position of the slits. However, it is within the scope of the present invention, where pad 2 is sufficiently coherent, to dispense with sheet 7 and to form the required axial slits described below in sheet 5.

5

Two parallel but spaced apart slits 10 are formed in sheet 7 extending axially over the area of the diaper to be in contact with the crotch area of the wearer. These slits are in register with two of the elasticating threads 11 carried
10 by the sheet 7. If desired, transverse end 12 cuts can be formed at each end of the slits 10 to aid formation of a flap in sheet 7 which can be folded to form a sleeve around the thread 11. The threads 11 are retained in their tensioned state by the remainder of the bonding of the
15 threads to sheet 7 over areas beyond the slits and at least partially within the length of the slits 10 by being adhered terminally over areas A and B to the sleeve. The tension in the threads causes the sleeve to contract axially as shown by the diagrammatic shirring effect 14 in Figure 1. It will
20 be appreciated that this occurs when the axial tension in the diaper is released when the individual diapers are cut from the length of composite fabric and the diaper curls due to the tension in threads 6 and 11, not when the diaper is held in the axially extended flat configuration shown in
25 Figure 1. As a result, the flap and sleeve form an upstanding cuff along the crotch area of the diaper when this is worn by a user. As shown in Figure 1, these cuffs can extend axially only over the crotch region of the diaper, that is over the length of the diaper over which
30 they will need to be effective. This shorter length than conventional cuff designs also reduces the risk that the cuff will flop over when the diaper is applied to the wearer, which has hitherto represented a risk of negating the dam effect of the cuff. It is preferred that the slits
35 be formed inwardly of the lateral edges of the underlying

absorbent layer so that material trapped by the cuffs is retained within the plan area of the absorbent layer and does not escape laterally. Sheet 7 with the elastics and the slits is preferably preformed and fed as such to the
5 diaper construction line.

The diaper can otherwise be of conventional design and construction with the layers of the diaper fabric bonded together, notably over the waistband areas C and D at each
10 end of the diaper, and with the crotch areas E and F cut away to form an anatomically shaped diaper. Preferably, further elastics are provided at the edges of the diapers in the cut away crotch areas, for example by including further axial elastic threads 20 in these regions to aid
15 formation of secondary cuffs along the edges of the diaper.

The invention has been described above in terms of a diaper to be worn by an infant. However, it will be appreciated that the invention can be applied to other forms of article
20 to be worn upon the person to retain bodily fluids, for example sanitary pads or incontinence pads or to pads which are to be inserted into panty hose or other apparel for disposal separately; and to wound dressings or adhesive plasters which are applied to the person. Accordingly, the
25 term sanitary article is to be construed generally to include all forms of absorbent pads for use upon the person to absorb urine, faeces, blood and other bodily fluids.

As indicated above, the slits 10 can also be formed
30 transversely rather than axially as described above. In such a case essentially the same form of construction for the slits and the two sheet construction of the next-to-the-skin layer of the diaper may be used.

CLAIMS:

1. A sanitary article formed from a composite fabric having a fluid impervious outer layer, an intermediate
5 absorbent layer and an inner next-to-the-skin layer, characterised in that at least two parallel slits are formed in a sheet in the next-to-the-skin layer of the article, and in that at least the outward lip of each slit is provided with means whereby that lip is caused to adopt an upstanding
10 configuration to provide a cuff which is upstanding with respect to the plane of the sheet in which it is formed over at least part of the axial length and/or transverse width of the article.
- 15 2. An article as claimed in claim 1, characterised in the article is a disposable diaper.
3. An article as claimed in either of claims 1 or 2, characterised in that the outward lip of the slit is caused
20 to upstand by means of one or more elastication means incorporated into the lip of the slit.
4. An article as claimed in either of claims 2 or 3, characterised in that the slits are formed axially in the
25 diaper within the crotch area of the diaper.
5. An article as claimed in any one of the preceding claims, characterised in that the parallel slits are formed as line cuts in the exposed sheet of the next-to-the-skin
30 layer of the composite fabric.
6. An article as claimed in any one of the preceding claims, characterised in that there is provided an intermediate sheet layer between the exposed next-to-the-skin
35 sheet and the absorbent layer of the composite fabric,

and the intermediate sheet underlies at least the plan area of the slits.

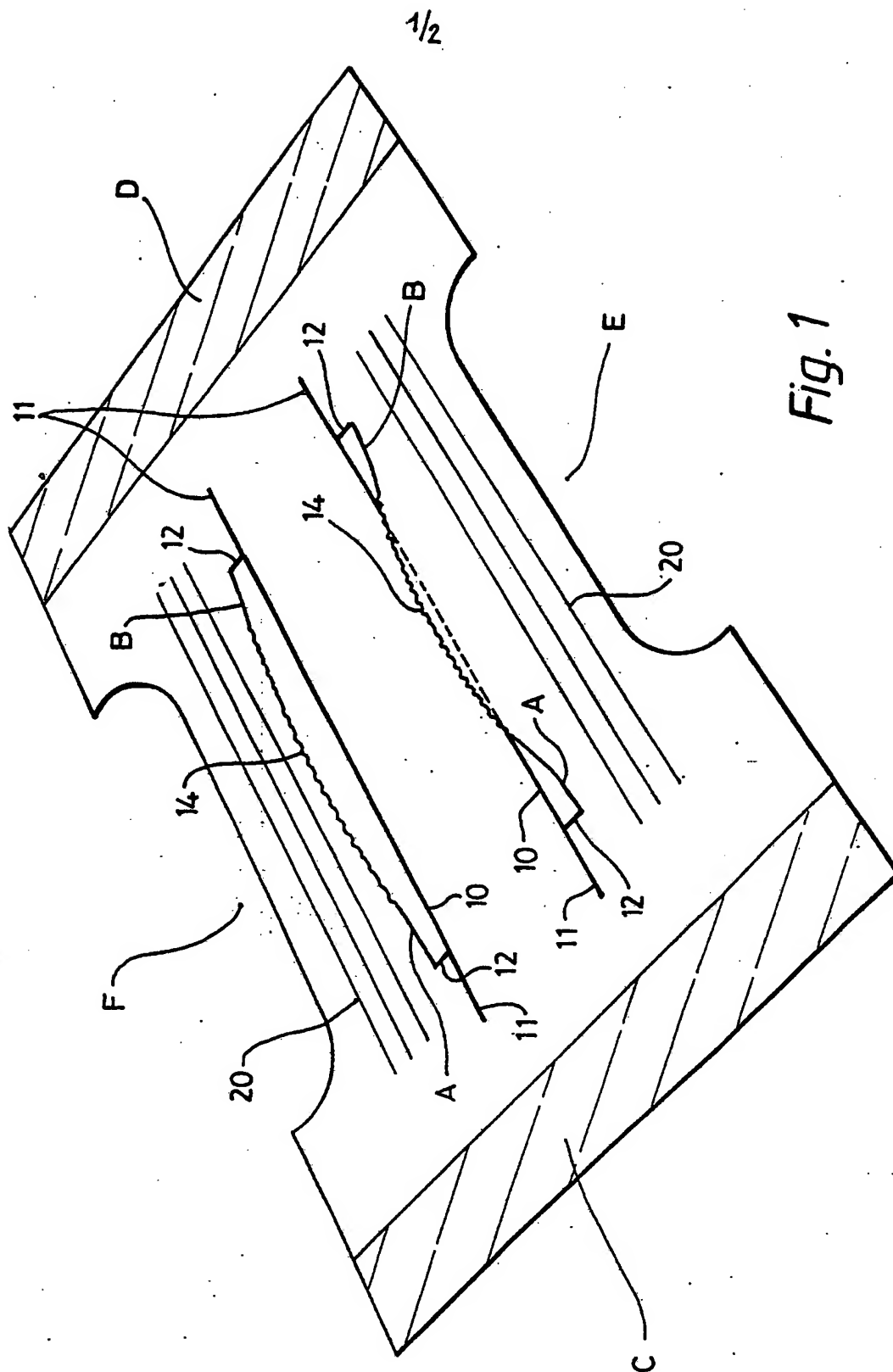
7. An article as claimed in any one of claims 1 to 5,
5 characterised in that the slits are formed in a sheet of material underlying the exposed next-to-the-skin sheet where the exposed sheet can flex sufficiently to allow the lip of the slit formed in the underlying sheet to upstand and cause the overlying sheet to conform to the body shape of a wearer
10 of the article.

8. An article as claimed in any one of the preceding claims, characterised in that the slits form flaps in the sheet in which they are cut and the free axial edge of the
15 flap is formed into a sleeve which encircles one or more axial elastication means which are secured to the material of the flap over the axially terminal portions thereof, but are free to move within 40 to 60% of the axial length of the sleeve.

20 9. A sanitary article substantially as hereinbefore described with respect to and as shown in the accompanying drawings.

25 10. A method for forming a leg cuff in a disposable diaper formed from a composite fabric having a fluid impervious outer layer, an intermediate absorbent layer and an inner next-to-the-skin layer, characterised in that the method comprises forming two parallel slits in a sheet in the next-
30 to-the-skin surface layer of the diaper and providing one or more elastication means at or adjacent at least the outward lip of the slits whereby that lip is caused to adopt an upstanding configuration when the diaper is in the relaxed state.

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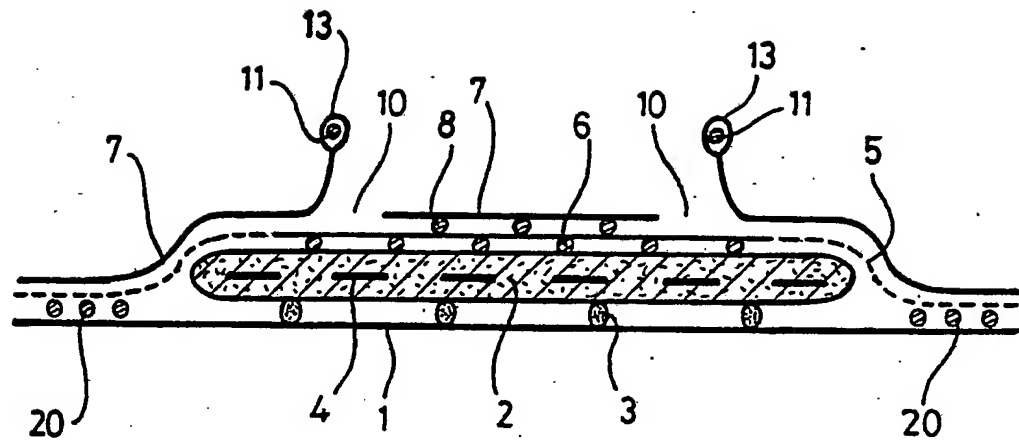


Fig. 2

INTERNATIONAL SEARCH REPORT

PCT/GB 92/01584

International Application No

I. CLASSIFICATION OF SUBJECT MATTER. (If several classification symbols apply, indicate all)⁶

According to International Patent Classification (IPC) or to both National Classification and IPC.

Int.Cl. 5 A61F13/15

II. FIELDS SEARCHEDMinimum Documentation Searched⁷

Classification System

Classification Symbols

Int.Cl. 5

A61F

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched⁸**III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹**

Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	EP,A,0 098 512 (LANDSTINGENS INKÖPSCENTRAL) 18 January 1984 see page 4, line 7 - line 15; figures 7-8 ---	1-6,8-9
A	EP,A,0 311 333 (PROCTER & GAMBLE) 12 April 1989 see figure 3 ---	1-6,9
E	FR,A,2 677 541 (PEAUDOUCE) 18 December 1992 see figure 5 -----	1-6,9-10

¹⁰ Special categories of cited documents:^{"A"} document defining the general state of the art which is not considered to be of particular relevance^{"E"} earlier document but published on or after the international filing date^{"L"} document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)^{"O"} document referring to an oral disclosure, use, exhibition or other means^{"P"} document published prior to the international filing date but later than the priority date claimed^{"T"} later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention^{"X"} document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step^{"Y"} document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.^{"A"} document member of the same patent family**IV. CERTIFICATION**

Date of the Actual Completion of the International Search

14 JANUARY 1993

Date of Mailing of this International Search Report

04.02.93

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

NICE P.

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

**GB 9201584
SA 63873**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. **14/01/93**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0098512	18-01-84	SE-B- 446055	11-08-86
		CA-A- 1211902	30-09-86
		DE-A- 3378352	08-12-88
		JP-B- 3057782	03-09-91
		JP-A- 59025741	09-02-84
		US-A, B 4490148	25-12-84
		US-E- RE33106	07-11-89
EP-A-0311333	12-04-89	US-A- 4808177	28-02-89
		CA-A- 1303794	23-06-92
		JP-A- 1162807	27-06-89
FR-A-2677541	18-12-92	None	